



The importance of ESG and sustainability in M&A (2022)



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Introduction

Welcome to the 2022 edition of our ESG and sustainability in M&A report. In the year that has passed since we issued the previous version of this report, developments such as the revision of Japan's Corporate Governance Code in June 2021 (hereinafter, the CG Code revision) and market reorganisation of the Tokyo Stock Exchange in April 2022 (hereinafter, the TSE market reorganisation), as well as the outcomes of the 26th UN Climate Change Conference (COP26), served both to advance climate change and human rights frameworks on a global scale, and also to clarify the priorities for sustainability management at Japanese corporations.

The CG Code revision clarified corporate requirements concerning sustainability, including:

- (1) to establish a basic policy and disclose initiatives on the company's sustainability,
- (2) to enhance the quality and quantity of climate change disclosures based on the Task Force on Climate-related Financial Disclosures (TCFD) or an equivalent international framework (for companies listed on the Prime Market only) and
- (3) to promote diversity in senior management and to disclose talent development policies ensuring diversity.

Sustainability management by Japanese companies was also largely attributable to the more recent TSE market reorganisation, which introduced the following:

- (1) application of the basic principles of the CG Code to the Growth Market,
- (2) the application of all principles of the CG Code to the Standard Market and
- (3) the application of all principles at a higher level for the Prime Market.

Companies listed on the Prime Market, in particular, are required to collect and analyse the necessary data on the impact of climate change-related risks and earning opportunities on their business activities and profits, and enhance the quality and quantity of disclosure based on the TCFD recommendations or an equivalent framework. This has led to the acceleration of TCFD initiatives by applicable companies.

The following trends in sustainability management have also had an impact from an ESG (environment, social and governance) perspective.

Environmental: The US hosted the 2021 Leaders Summit on Climate in April 2021, and Japan pledged to reduce greenhouse gas (GHG) emissions by 46% by 2030 compared to 2013 levels. The COP26 in November discussed issues that significantly affect business activity, such as the gradual reduction of coal-fired power

generation for which GHG reduction measures have not been taken, efforts to phase out inefficient fossil fuel subsidies, doubling of the funding provided to developing countries by 2025 and progress on carbon credit trade rules in international carbon markets.

Social: International efforts with respect to human rights made great progress in 2021, with events in the Xinjiang Uyghur region and Myanmar having a significant impact on a wide variety of business activities. In October, a G7 Trade Ministers' Communique was issued, making a commitment to: (1) recognising the importance of government roles in implementing the principles of transparency in global supply chains and business and human rights, and (2) committing to further strengthening business clarity and predictability and promoting guidelines on human rights due diligence, urging each country to make greater effort on this issue. In Japan, in response to the National Action Plan (NAP) on Business and Human Rights formulated in 2020, the Ministry of Economy, Trade and Industry established the Business and Human Rights Policy Office in July 2021, and Keidanren (the Japan Business Federation) developed a Handbook for Management that Respects Human Rights in December 2021. In response to these developments, the private sector in Japan is also accelerating their actions regarding respect for human rights.

Governance: Proposals calling for concrete measures to protect the environment were notable at the general shareholder meetings of major companies in 2021. Specifically, proposals were made by NGOs for the disclosure of management strategies in accordance with the Paris Agreement and by activists for the inclusion of the disclosure of management strategies based on the TCFD in the Articles of Incorporation, among others. In response, an increasing number of companies have established a department or committee dedicated to sustainability, which supervises or assists the Board when examining and making decisions on sustainability. At the same time, cases of quality fraud have continued to occur in major manufacturing industries, requiring companies to reform their conventional Japanese style of governance; the closed culture of manufacturing sites and weak leadership of headquarters.

This report aims to analyse and examine recent trends in ESG-related M&A in Japan using both publicly available data and information provided by RECOFDATA Corporation. We have also analysed trends in biodiversity and human rights, based on the understanding that they may have a material impact on the future of M&A.

When comparing data trends over the past five years, it becomes apparent that ESG-related M&A cases increased significantly in 2021. This indicates that an increasing

number of Japanese companies are incorporating ESG into their management policies and business strategies. From a broader perspective, the number of M&A deals that take into account the SDGs, ESG and sustainability increased significantly in 2021, which can be seen as evidence that sustainability has taken on greater importance in management agendas.

If we look more closely into this trend, we can see that the number of M&A deals associated with climate-related keywords such as 'renewable energy', 'decarbonisation' and 'carbon neutral' nearly doubled from 2020 to 2021. Based on this, we can say that decarbonisation drove significant business transformations in 2021, such as the restructuring and sale of businesses with large GHG emissions and investments in new decarbonised businesses. For example, the number of M&A deals involving coal-related businesses, which typically have high GHG emissions, doubled compared to 2020. At the same time, M&A deals related to new businesses associated with decarbonisation have been increasing since the beginning of 2021. M&A deals related to hydrogen and ammonia, one of the most common

examples of these new businesses, have almost doubled compared to 2020, and the term 'CCUS' (carbon capture, utilisation and storage) has also begun to appear as an M&A keyword for the first time in 2021.

In terms of the circular economy, M&A deals related to waste, garbage and recycling increased three- to four-fold in the five years from 2017 to 2021. The year-on-year increase in 2021 was particularly notable, and we believe that policies and fiscal support related to the circular economy aimed at decarbonisation are the major factors behind this.

Our analysis has confirmed that the number of M&A transactions related to climate change countermeasures and the circular economy, which are especially important sustainability-related topics, has rapidly increased in the Japanese market in recent years. As companies in Japan continue to take measures against climate change and enter the implementation stage of their net-zero roadmaps, we expect the number of deals that serve to inorganically realise these transformations to further increase.

Research methods used for this report

Using the RECOF DATA Corporation's M&A database, we conducted text mining analysis and case studies on about 19,000 M&A deals involving Japanese companies (including Japanese branches of foreign companies and foreign companies in which Japanese companies have a capital participation) that were announced during the five-year period from January 2017 to December 2021.

M&A deals recorded in the RECOF M&A database are those in which the management rights of companies and businesses are transferred for the purpose of utilising existing management resources, including acquisitions of shares that lead to management participation. Business alliances that do not involve the transfer of assets and liabilities are not included.

We followed the method used in the RECOF M&A database to classify business types and M&A types. Deals between domestic companies are classified as 'in-in'; M&A deals where rights in foreign companies are bought by domestic companies are classified as 'in-out'; M&A deals where rights in domestic companies are bought by foreign companies are classified as 'out-in'; and M&A deals involving two parties who are both Japanese branches of foreign companies or foreign companies in which Japanese companies have a capital participation, as well as sell-outs of shares of foreign companies in which Japanese companies have a capital participation, are classified as 'foreign companies'.

In text mining analysis, we applied natural language processing techniques, including morphological analysis, to text data of M&A deal summaries (summaries made with the RECOF M&A database that summarise the attributes of the parties, schemes, M&A objectives, etc.) extracted from the RECOF M&A database and analysed trends in words and key phrases. In natural language processing, we used sustainability-related terms reflecting the insights of PwC professionals. Some sentences may have been analysed in an unnatural format depending on sentence data types, paragraphing methods and dictionaries used in morphological analysis. We did not perform additional processing for these irregularities because their impact on this research was minor.



1. Overall trends in ESG-related M&A

An increasing number of ESG-related M&A deals

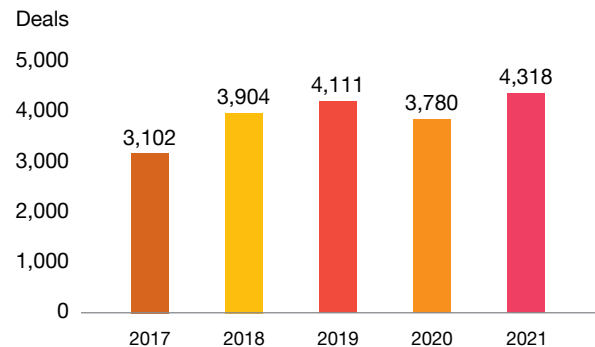
The importance of sustainability management is rapidly increasing in the Japanese business environment. We have therefore based our hypothesis on the assumption that companies need to respond quickly to these changes in the environment and that the number of ESG-related M&A deals is increasing as a result.

The RECOF M&A database includes M&A deals from 2018 onwards that include ESG investment and SDGs-related initiatives within the investment objectives or the business operations of the target companies. The number of deals falling into this category increased exponentially from only 14 in 2018, 17 in 2019 and 34 in 2020 to a substantially greater 273 deals in 2021, representing approximately 6% of all deals in the RECOF M&A database for the year.

According to our text-mining analysis of all deal summaries from the RECOF M&A database from 2017 to 2021, the number of deals containing the keywords 'SDGs', 'ESG' and 'sustainable' has shown an upward trend as shown in Figure 1-3 and has been increasing rapidly, especially since the beginning of 2021.

In consideration of this trend, we assume that the increasing number of deals reflects the fact that Japanese companies are beginning to use M&A as a means of realising sustainability management, and that they are beginning to disclose the purposes and aims of such deals as a way to market their sustainability efforts.

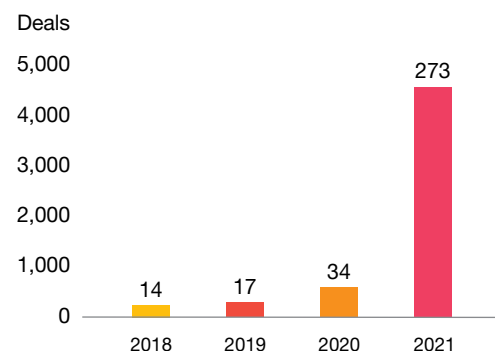
Figure 1-1: Total number of M&A deals involving Japanese companies



Note: Deals involving Japanese branches of foreign companies and foreign companies in which Japanese companies have a capital participation are included.

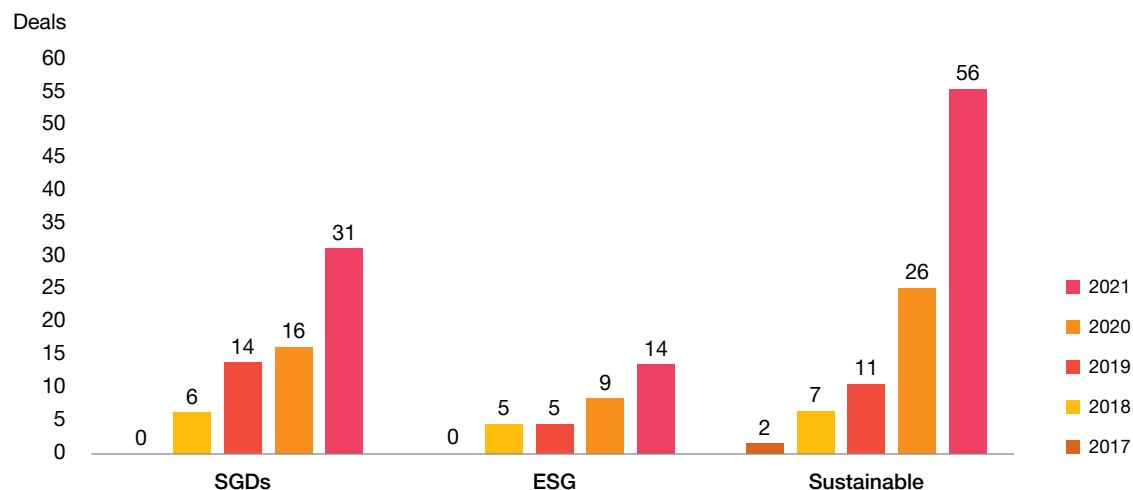
Source: RECOF M&A database, PwC

Figure 1-2: Total number of M&A deals related to SDGs- and ESG-related investments based on the RECOF M&A database



Source: RECOF M&A database, PwC

Figure 1-3: Total number of M&A deals with ESG-related keywords based on text mining analysis



Note: Figures for the keyword 'sustainable' include both 'sustainable' and 'sustainability'.

Source: RECOF M&A database, PwC

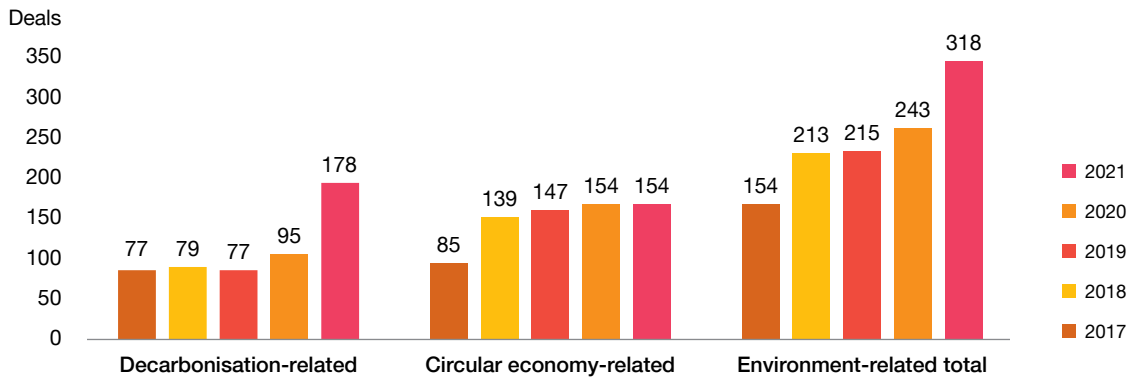
M&A deals incorporating environmental, social and governance perspectives

How do Japanese companies incorporate each of the ESG perspectives (environment, social and governance) into their management strategies, and how are these perspectives reflected in their deals?

Based on our text-mining analysis, specific initiatives by companies have begun especially in the environmental field, as evidenced by the number of deals in this area. M&A deals related to decarbonisation and the circular

economy, which we consider to be particularly important, were already on the rise in the years leading up to 2021, as seen in Figure 1-4. In 2021, the increase in the number of decarbonisation-related M&A deals was particularly remarkable. In the following sections, we describe the details of deals related to decarbonisation and the circular economy, as well as biodiversity, which we believe will be important in deals in the future.

Figure 1-4: Total number of M&A deals with environment-related keywords based on text mining analysis



Note: 'Decarbonisation-related' keywords include the following: 'renewable energy', 'solar', 'wind power', 'biomass', 'decarbonisation', 'carbon neutral', 'coal', 'cement', 'hydrogen', 'ammonia', 'offset' and 'CCUS'.
 'Circular economy-related' keywords include the following: 'recycling', 'reuse', 'rental', 'sharing', 'waste', 'garbage', 'residue', 'circular', 'recycling', 'resource circulation'.
 'Environment-related total' is the total number of deals, after factoring out any overlap in 'decarbonisation-related' and 'circular economy-related' deals.

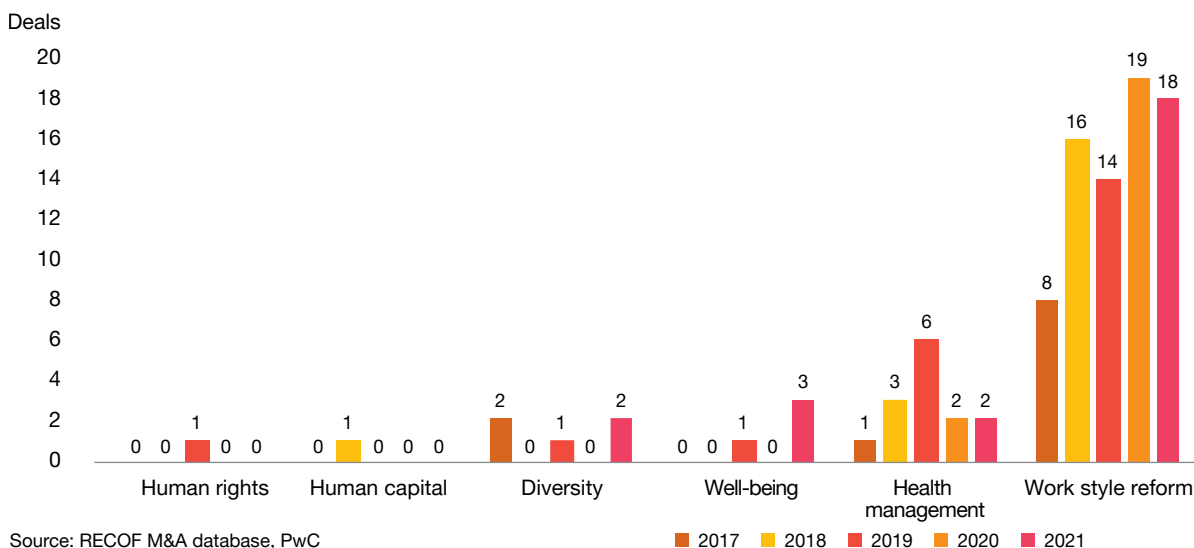
Source: RECOF M&A database, PwC

The social aspect of ESG covers a wide range of fields, and the issues that companies need to focus on differ depending on the type of business and the industry in which they operate. As shown in Figure 1-5, the number of M&A deals involving related keywords, as identified by our text mining analysis, remains small. Although some deals have taken place in relation to businesses that provide services on high-profile social issues such as work style

reform, social issues in general do not easily serve as drivers for M&A activity.

Relationships with various stakeholders are also becoming increasingly important, with deals also taking place with the goal of improving the company's human rights and diversity record. These deals will also be covered later in this report.

Figure 1-5: Total number of M&A deals with keywords related to social perspectives based on text mining analysis

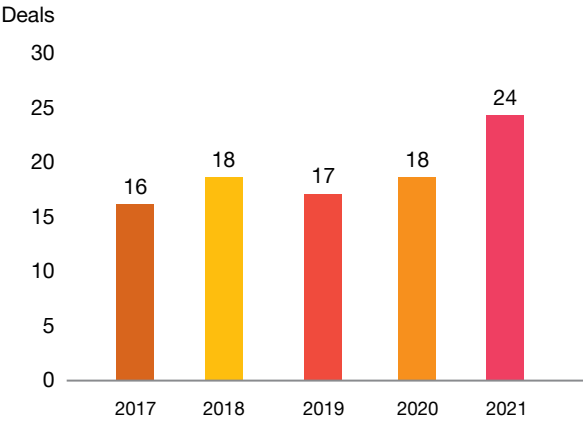


Source: RECOF M&A database, PwC

Governance plays a role in supporting the entire company, as well as supporting the environmental and social aspects of ESG, and therefore is important from the perspectives of both companies and investors. The CG Code revision of June 2021 calls on companies to further strengthen and enhance their corporate governance from the perspectives of improving the functions of the Board of Directors, ensuring diversity in core human resources and addressing sustainability issues.

Our text mining analysis shows that the number of deals involving the keyword ‘governance’ has been on the rise in recent years (Figure 1-6). Among the wide-ranging issues around post-merger integration (PMI), the development and strengthening of governance after the acquisition of the target company has become an area of focus. Over the past five years, 65% of the buyers in these M&A deals were in the ‘other finance’ industry as defined by the RECOF M&A database, and most of those were investment funds. Publicly-traded companies accounted for 64% of the target companies, and these deals included take-over bids and management buyouts. Cases where activist funds make minority investments in publicly traded companies stand out in particular, and management proposals on strengthening corporate governance made with the goal of improving shareholder value and increased opportunities for discussion with management indicate a heightened level of shareholder activism.

Figure 1-6: Total number of M&A deals with governance-related keywords based on text mining analysis



Source: RECOF M&A database, PwC





2. Decarbonisation and M&A

The shift from renewable energy-related M&A deals to those aimed at business transformation

The threat of extreme weather and natural disasters caused by global warming makes climate change one of the greatest challenges facing the world.

At COP26, which was held from October to November 2021, participating states were called upon to take ambitious climate change measures by the mid-term goal of 2030, with the aim of achieving carbon neutrality by the middle of this century and making efforts to limit global warming to 1.5°C as set out in the Paris Agreement. All countries were also called upon to accelerate their efforts to reduce the use of coal power and to phase out 'inefficient' fossil fuel subsidies.

In October 2020, the Japanese government declared its aim to become carbon neutral by 2050, and in April 2021 announced that it would aim to reduce GHG emissions by 46% from FY2013 levels by FY2030 and that it would continue to work to achieve an even higher reduction of 50%.

With the CG Code revision in June 2021, companies listed on the Prime Market of the Tokyo Stock Exchange are now required to disclose the impact of risks and opportunities related to climate change on their business activities and earnings based on the TCFD or an equivalent international framework. Thus, it is becoming indispensable for companies to regard climate change as one of their most important management issues.

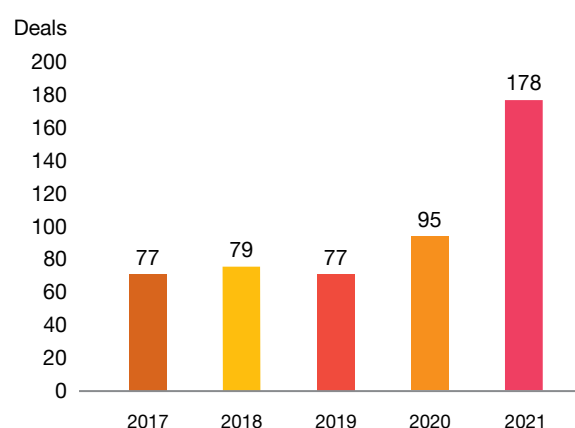
To coincide with this global trend toward decarbonisation, the number of decarbonisation-related M&A deals is also drastically increasing. In our text mining analysis, the number of M&A deals including such keywords as 'renewable energy', 'decarbonisation' and 'carbon neutral' nearly doubled between 2020 and 2021 (Figure 2-1).

Notably, buyers involved in deals with the keywords 'decarbonization' and 'carbon neutrality' include not only electricity and gas businesses, general trading firms and those classified as and 'other finance', which have traditionally engaged in a large number of deals in this area, but also manufacturing businesses, such as machinery and transport equipment, which now round out the top five business types of buyers (Figure 2-2).

In the areas of machinery and transport equipment, major end-product manufacturers need to comply with the RE100 criteria, which call for the acceleration of the transition to 'greener' electric power sources, as well as the GHG Protocol, which requires the decarbonisation of not only the company's own emissions (Scopes 1 and 2) but also emissions from their entire supply chain (Scope 3). In response to these guidelines, end-product

manufacturers have been adding GHG reductions to the terms of their deals with parts suppliers. This acceleration of decarbonisation efforts throughout the manufacturing industry seems to be one reason for the increase of deals in the sector.

Figure 2-1: Total number of M&A deals with decarbonisation-related keywords based on text mining analysis



Note: 'Decarbonisation-related' keywords include the following: 'renewable energy', 'solar', 'wind power', 'biomass', 'decarbonisation', 'carbon neutral', 'coal', 'cement', 'hydrogen', 'ammonia', 'offset' and 'CCUS'.

Source: RECOF M&A database, PwC

Figure 2-2: Top five business types of buyers and targets in M&A deals with the keywords 'decarbonisation' and 'carbon neutral' in 2021.

Buyer	Target company
Power/gas (9)	Power/gas (13)
General trading firm (8)	Chemical (10)
Other finance (7)	Electronics (8)
Machinery (5)	Software/information (6)
Transport equipment (4)	Service (6)

Source: RECOF M&A database, PwC. (Figures in parentheses show the number of M&A deals.)

While decarbonisation-related deals are showing noticeable growth in terms of numbers, when comparing the changes that occurred in 2020 and earlier and those that occurred in 2021, we can see a shift in the specific types of deals that are on the rise. Here, we analysed decarbonisation-related deals by dividing them into two types: renewable energy-related deals, which have been on an upward trend for several years, and deals related to business restructuring driven by decarbonization, which showed a great increase in 2021.

Among renewable energy-related deals, we found that solar power-related deals increased at the same pace

as the previous fiscal year (Figure 2-3). One noticeable change is the addition of the construction industry to the top three industries represented by the buyers in solar-related deals in 2021. For the four years prior to 2021, the top three industries were 'power/gas', 'other finance,' and 'general trading firms' (Figure 2-4). This change is indicative of the full-scale decarbonisation efforts throughout the construction industry, through such initiatives as the decarbonisation of buildings via net zero energy buildings and houses.

Figure 2-3: Total number of deals with renewable energy-related keywords based on text mining analysis

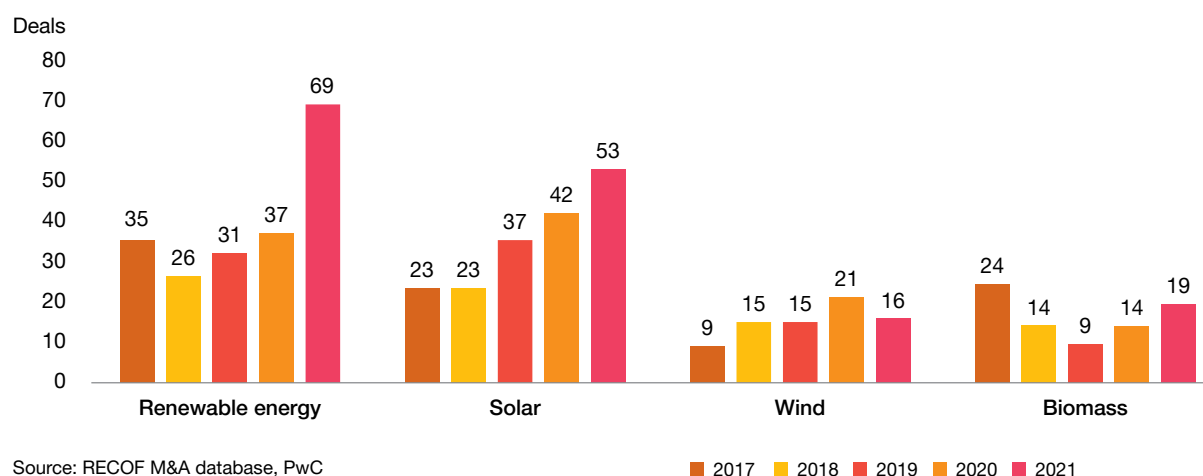


Figure 2-4: Top five buyer types for M&A deals with the keyword 'solar' in the last five years

2017	2018	2019	2020	2021
Power/gas (5)	Other finance (7)	Power/gas (10)	Power/gas (14)	Power/gas (15)
Other finance (5)	General trading firm (5)	Other finance (6)	Other finance (12)	Construction (7)
General trading firm (4)	Power/gas (4)	General trading firm (4)	General trading firm (5)	Other finance (6)
Other sales/wholesale (2)	Construction (2)	Other sales/wholesale (4)	Coal/oil (3)	General trading firm (5)
Service (2)	Other sales/wholesale (2)	Service (4)	Real estate/hotel (3)	Other sales/wholesale (5)

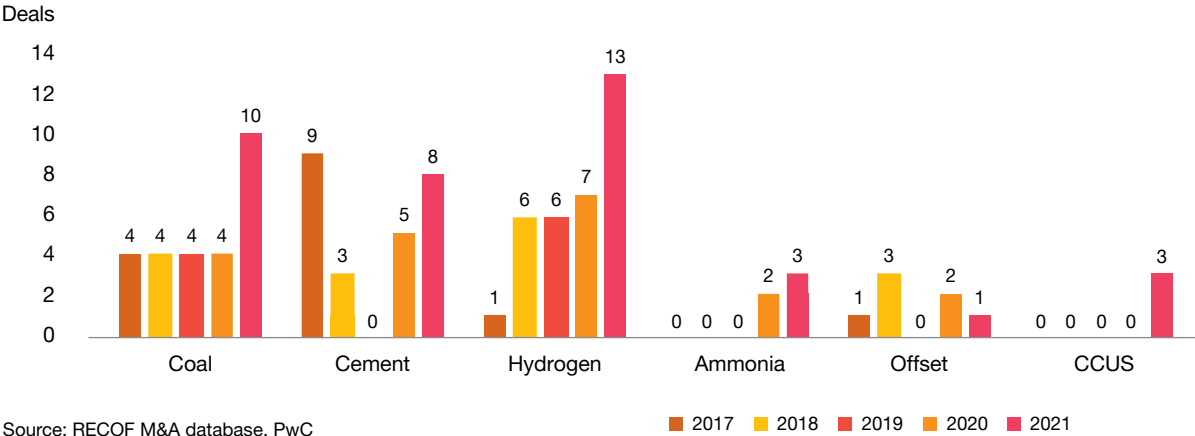
Source: RECOF M&A database, PwC (Figures in parentheses show the number of M&A deals.)

2021 was also a year in which business transformations driven by decarbonisation, such as the restructuring and selling out of businesses with large GHG emissions and investment in new decarbonised businesses, began to emerge in the form of M&A deals (Figure 2-5).

For example, the number of M&A deals involving coal-related business, which typically have high GHG emissions, doubled compared to the previous fiscal year.

At the same time, M&A deals related to new businesses associated with decarbonisation have been increasing since the beginning of 2021. M&A deals related to hydrogen and ammonia, one of the most common examples of these new businesses, have almost doubled compared to the previous fiscal year, and the term ‘CCUS’ (carbon capture, utilisation and storage) has also begun to appear as an M&A keyword for the first time in 2021.

Figure 2-5: Total number of M&A deals with decarbonisation-related keywords based on text mining analysis

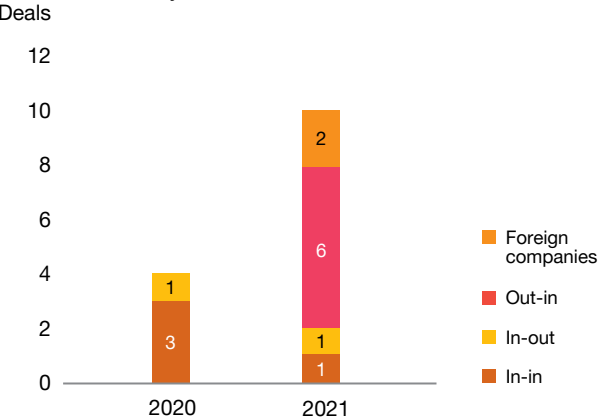


Source: RECOF M&A database, PwC

Looking at coal-related M&A deals from a cross-border perspective, while in-in deals accounted for almost all of the deals in 2020, out-in deals accounted for more than half of the total in 2021 (Figure 2-6). The advancement of cross-border coal business restructurings could be due to the global polarisation of companies on this matter: they are either looking to decarbonise by divesting their coal related businesses, or are in fact looking to acquire more coal businesses in the pursuit of economies of scale.

We also analysed hydrogen-related businesses as a representative example of new decarbonisation-related businesses. Our analysis of the major business types of buyers of hydrogen businesses in 2020 and 2021 suggests that, while trading firm and those categorised as ‘other finance’ remain significant players, companies in a wide range of other business areas, such as machinery and non-ferrous metal products have also come to recognise the potential of hydrogen as a new business area (Figure 2-7). This may indicate that companies that are having difficulty decarbonising their own businesses with green electricity alone are engaging in deals involving hydrogen-related businesses with the goal of entering new business fields while also trying to reduce their own GHG emissions.

Figure 2-6: Breakdown of deals with the keyword ‘coal’ in the last two years



Source: RECOF M&A database, PwC

Figure 2-7: Top five buyer types for deals with the keyword ‘hydrogen’ in the last two years

2020	2021
Machinery (3)	General trading firm (4)
General trading firm (2)	Machinery (3)
Other finance (1)	Non-ferrous metal products (2)
Service (1)	Other finance (2)

Source: RECOF M&A database, PwC. (Figures in parentheses show the number of M&A deals.)

Business expansion driven by decarbonisation

As the world continues on a one-way path toward decarbonisation, it is essential for companies to incorporate a decarbonisation strategy into their own management strategies. For companies, the trend toward decarbonisation is a risk in that it represents a significant change in the economic environment, but at the same time, it should be regarded as an opportunity to expand their own business into new areas. As mentioned previously, the number of decarbonisation-related deals is on the rise, while a shift has occurred in the specific types of deals taking place, from those whose main purpose is investment in renewable energy to those aimed at restructuring the buyer company. These changes clearly show that an increasing number of companies are incorporating decarbonisation into their management strategies and viewing decarbonisation as an opportunity.

At PwC, as part of our efforts to support our clients' management, we have established a framework for a 'decarbonisation roadmap' that aims to expand the business while quickly and efficiently advancing decarbonisation. The six steps in our decarbonisation roadmap are as follows.

(1) Understanding the current state of GHG emissions

For Scopes 1, 2 and 3, companies are shifting from making a corporate life cycle assessment (LCA) to individual product LCAs (which calculate the carbon footprint for each product). To reduce the emissions for an individual product, companies need to shift from calculating GHG emissions based on publicly available emission factor to calculating GHG emissions based on product LCA data provided by the supplier. Thus, for suppliers, disclosure of the results of product LCAs and reduction of GHG emissions through product LCAs are becoming necessary steps to ensure their business opportunities.

(2) Business portfolio restructuring and deals driven by decarbonisation

As mentioned above, the restructuring of business portfolios has begun to impact the number of deals in the coal and cement industry. Similar trends are expected to emerge in other industries, such as the automobile internal combustion engine field.

(3) Promotion of conventional efficiency and energy conservation activities

Because Japanese companies have already made considerable progress in their efforts to reduce GHG emissions, they are finding it difficult to make additional progress on their own. There is a limit to what any one company can do on its own to conserve energy. Therefore, they will need to consider strategies to promote energy conservation beyond the framework of individual companies, for example by utilising a cogeneration (combined heat and power) system shared by multiple companies in an industrial park.

(4) Electrification and greening of electric power

As related to (3) above, it can be difficult and technically time consuming for companies to reduce their Scope 1 emissions (GHG emissions associated with the company's own fuel combustion). To reduce in-house GHG emissions, as part of the formulation of a decarbonisation roadmap, companies must examine the potential for electrification in various processes, such as shifting from blast furnaces to electric furnaces as seen in the steel industry.

Regarding Scope 2 emissions (indirect emissions associated with the use of electricity supplied by other companies), although the emission factors of electric power companies are on the decline, projected emission factors vary greatly depending on regional differences and the operational status of nuclear power plants. In order to formulate an in-house decarbonisation roadmap, it is essential to forecast the future of GHG in a precise manner by assuming multiple scenarios. PwC supports the formulation of quantitative GHG predictions for each scenario using the Power Market Analytics method.

Furthermore, to achieve the greening of electric power, it is crucial for companies to formulate optimal purchasing strategies for and engage in the procurement of multiple renewable energy purchasing methods, such as corporate power purchase agreements (PPAs), self-consignment of power and the purchase of green power certificates. Management decisions based on an investment recovery model linked to business plans are also essential.

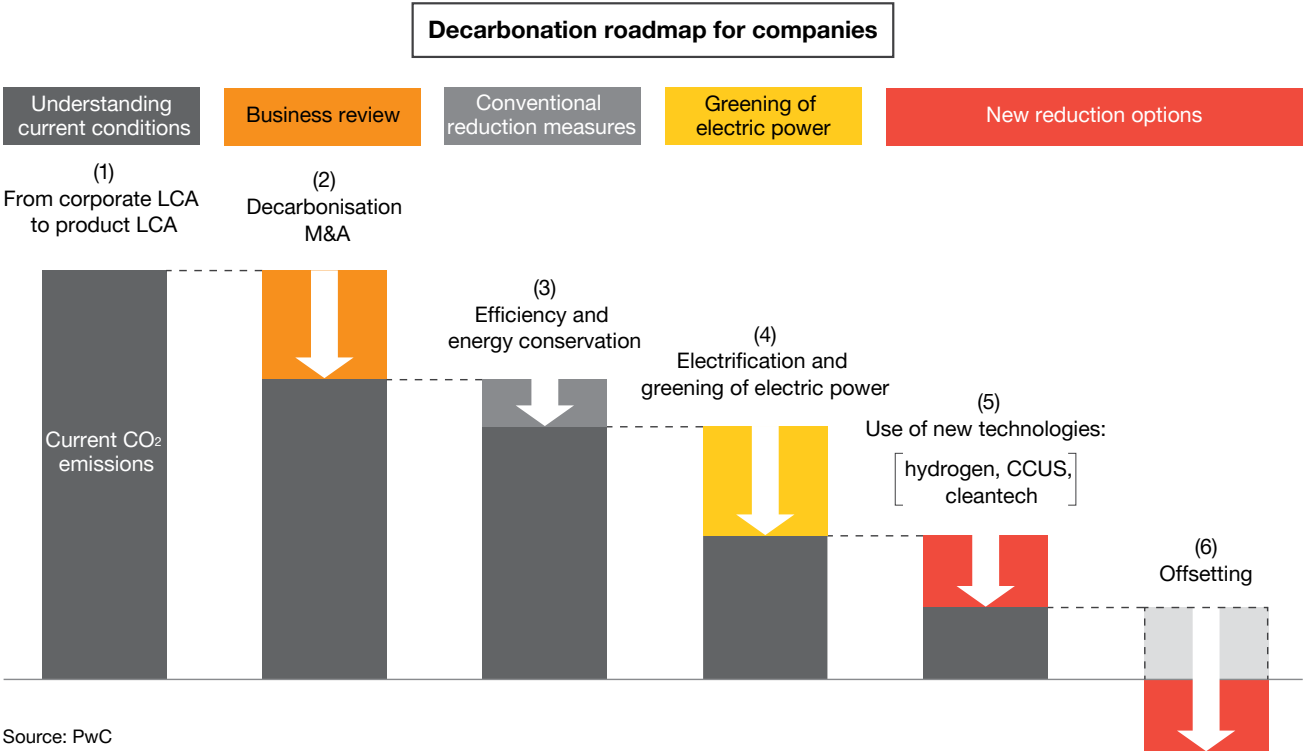
(5) Entering new businesses and reducing GHG emissions by using new technologies such as hydrogen, CCUS and cleantech

We expect the full-scale implementation of hydrogen and CCUS in society to occur in or after 2030. Based on this, companies are now at the seed stage for entering those new businesses, and must therefore begin examining upfront investment with an eye on the future business portfolio.

(6) Using offsets for short-term GHG reductions or as a measure to reduce the GHG emissions that will ultimately remain

One recent trend is the use of emission offsets, for example in the form of credits, as an effective means when it becomes necessary to reduce GHG emissions in a short period of time. Offsets can be used, for example, when suppliers of finished products demand prompt GHG reductions or when GHG reductions are required to comply with various regulatory systems such as the EU Emissions Trading Scheme (EU-ETS). Because the accepted methods of emissions offsets differ depending on the system, protocol and finished product manufacturer, companies must formulate the optimal procurement strategy in terms of credit selection, purchase volume and period according to the situation.

Figure 2-8: Decarbonisation roadmap



Source: PwC

This M&A trend analysis suggests that we have entered a new period in terms of corporate decarbonisation, where companies actively use these frameworks to plan and implement decarbonisation strategies that go beyond just using renewable energy.





3. Circular economy and M&A

As initiatives related to the SDGs, ESG and sustainability advance throughout the world, the idea of a circular economy has been increasingly recognised and applied as an important element for realising sustainable growth while solving environmental and social issues.

In Japan, the Green Growth Strategy Through Achieving Carbon Neutrality in 2050 was announced in June 2021, and to realise this strategy, the Revised Act on the Promotion of Global Warming Countermeasures and the Act on Promotion of Resource Circulation for Plastics were enacted in April 2022. Also in April 2022, in the TSE market reorganisation took place, and the requirement for companies listed on the Prime Market to disclose risk information related to climate change based on the TCFD or equivalent frameworks took effect. In this way, Japanese social and economic systems are in a period of reform.

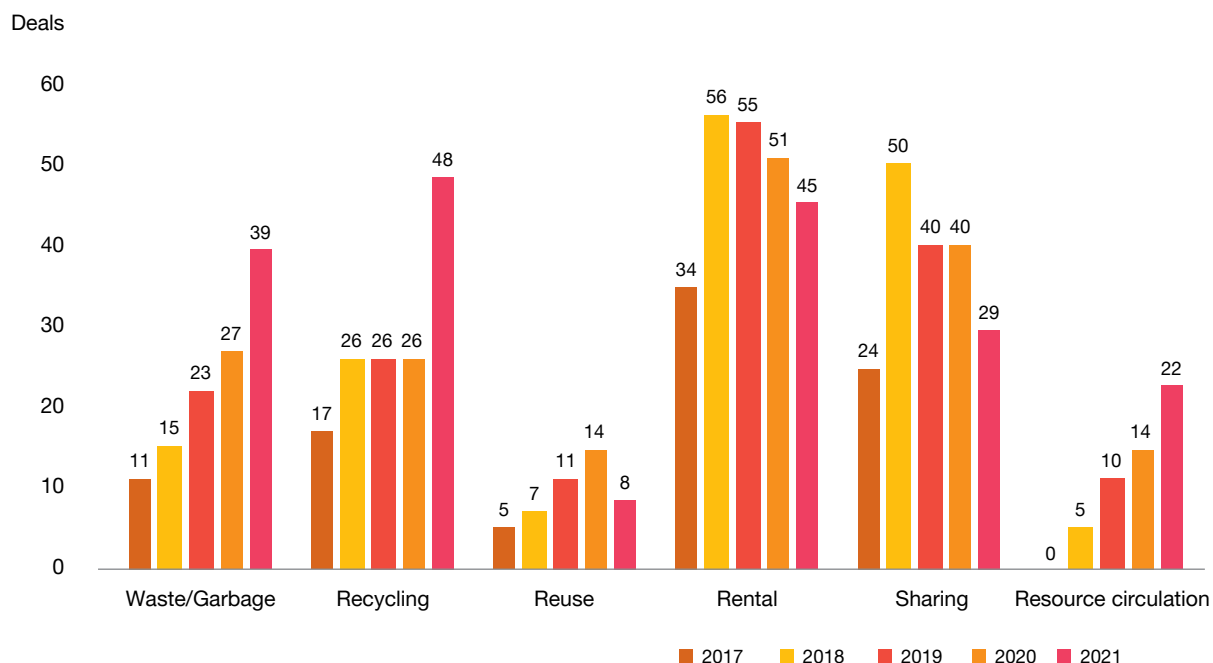
The vision of the Revised Act on the Promotion of Global Warming Countermeasures is to enhance the continuity and predictability of policies, accelerate measures, investments and innovations toward decarbonisation,

and promote decarbonisation measures through the use of renewable energy sources in regional communities and increased decarbonization actions by companies. The Act aims to achieve a circular society and a circular economy through collaboration among local governments, companies, financial institutions and other organisations.

This will broaden the perspective of companies from the net-zero strategies they have been working on for their own value chains to the construction of social and economic systems aimed at energy and resource circulation within the local communities. This will serve as an opportunity to promote collaboration among industry, government and academia, as well as among different areas of business.

Looking at trends in actual M&A transactions based on our text mining analysis, the number of deals including the keywords 'waste', 'garbage', 'recycling' and 'resource circulation' has increased three- to four-fold in the past five years. A significant jump can be seen in 2021, when policies related to the circular economy were launched in rapid succession (Figure 3-1).

Figure 3-1: Total number of M&A deals with circular economy-related keywords based on text mining analysis



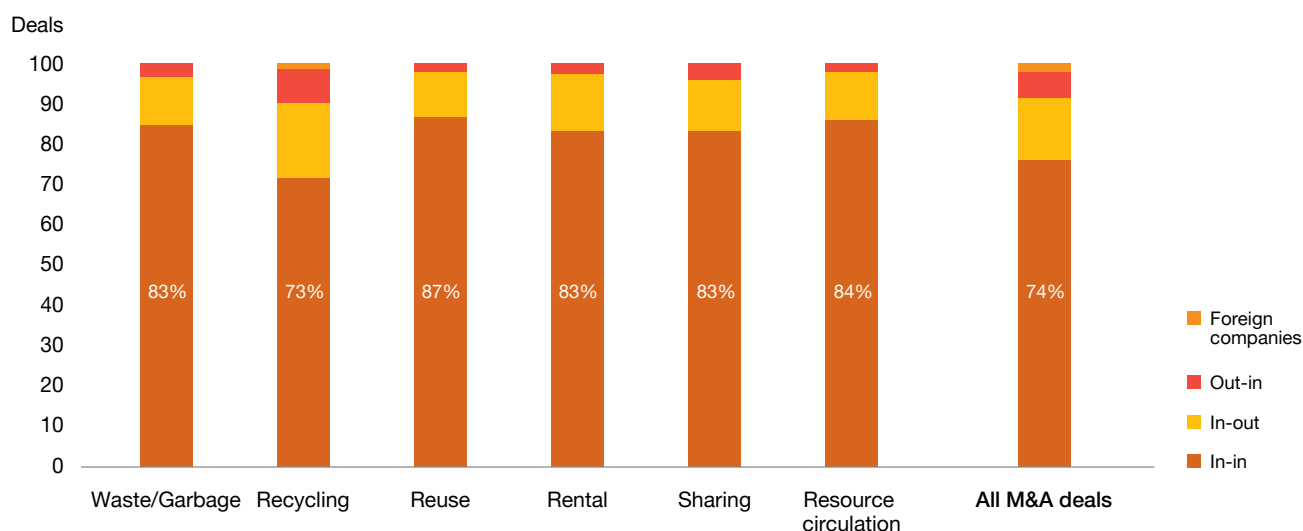
Note: 'Resource circulation' includes the keywords 'resource circulation', 'recycling-oriented' and 'circular'

Source: RECOF M&A database, PwC

These circular economy-related M&A deals are mainly deals between Japanese companies, and more than 80% of deals involving various related keywords are in-in (Figure 3-2). We can hypothesise that one reason for this is that overseas companies face high barriers when it comes to this type of deal, due to the fact that waste treatment and recycling businesses are regulated by many different domestic laws in Japan, and the supply

chain includes companies in many different fields, such as waste collectors. Another reason for the increasing number of deals between domestic companies in this field may be that the industrial structure is dispersed in the form of small and medium-sized companies, which are now seeking to expand their business scales through M&A.

Figure 3-2: Component ratios of M&A deals in the past five years



Note: 'Resource circulation' includes the keywords 'resource circulation', 'recycling-oriented' and 'circular'.

Source: RECOF M&A database, PwC

Trends in M&A deals related to waste and garbage and recycling

Looking at trends in M&A deals involving the keywords 'waste' or 'garbage' and 'recycling', the number increased three- to four-fold in the five years from 2017 to 2021, as shown in Figure 3-1. The year-on-year increase in FY2021 is particularly notable, and we believe that policies and fiscal support related to the circular economy aimed at decarbonisation are the major drivers behind this.

When looking at the M&A deals involving these keywords in which we can clearly ascertain the target materials, many involve plastics, metals or food (Figure 3-3). Deals related to solutions to recently pressing social issues, such as environmental issues and food loss, are on the rise.

For those of these deals for which the purpose is clearly stated, a large number of deals state energy use as their purpose, and this number is growing rapidly (Figure 3-4). This suggests that more companies are taking measures to acquire renewable energy sources related to the effective use of waste or to convert waste materials into fuel. The business domains of waste and recycling have a high affinity with platform businesses and with IT and digital transformation (DX) solutions from the perspectives of digitizing waste manifests and documentations, optimizing the matching of polluters and recyclers, and the streamlining of waste collection and transportation, and the increase in the number of M&A deals aimed at generation of these new business models is notable.

Figure 3-3: Total number of M&A deals with the keywords 'waste' or 'garbage' and 'recycling' by major target material

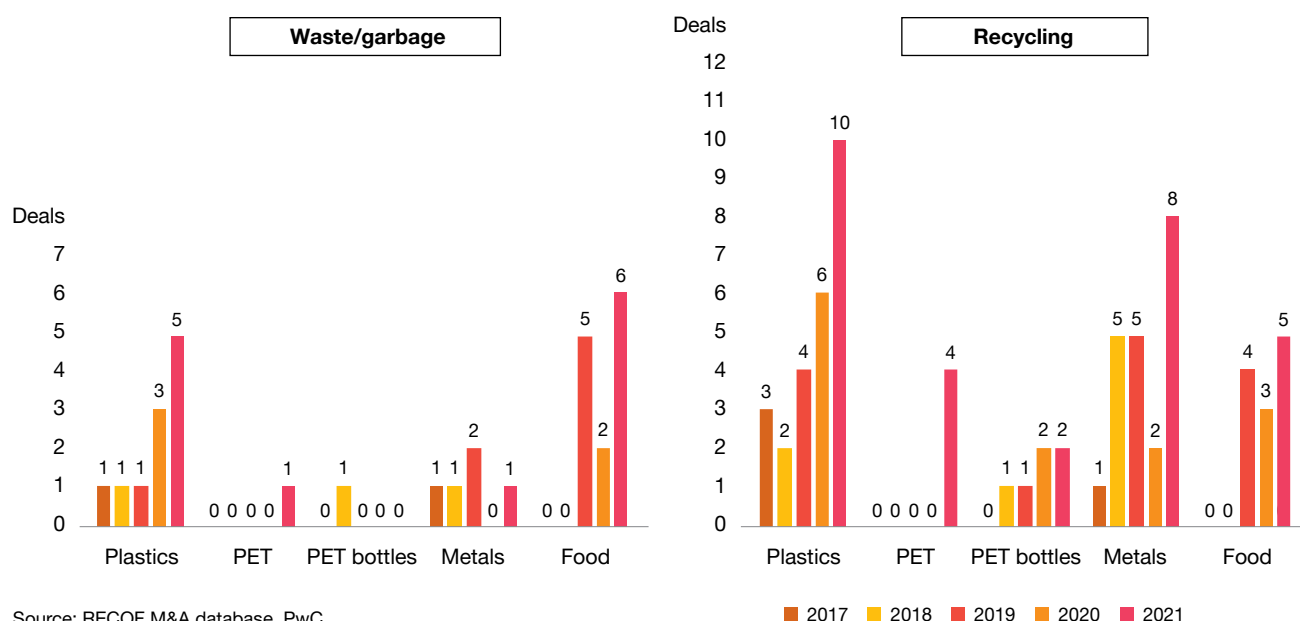
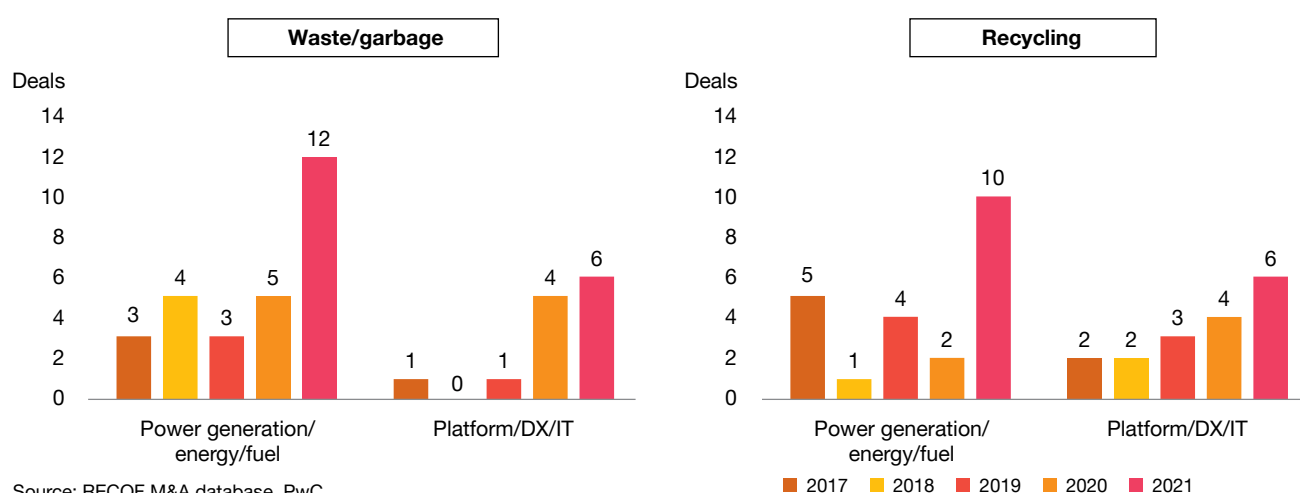


Figure 3-4: Total number of M&A deals with keywords 'waste' or 'garbage' and 'recycling' by purpose



Trends in M&A deals related to reuse, rental and sharing

According to the Sharing Economy Association, Japan and InfoCom Research, Inc., the domestic sharing economy market grew to 2.4 trillion yen in 2021 and is estimated to reach 14 trillion yen (based on problem-solving scenarios) by 2030.¹

As seen in Figure 3-1, the number of M&A deals with the keywords 'reuse', 'rental' and 'sharing', which are related to the sharing economy, have remained stable, but the number of M&A deals with the keywords 'rental' and 'sharing' is high (30 to 50 deals per year).

Many of these deals take the form of M&A with platforms, infrastructure and matching functions related to specific services as their main target, and these deals are seen in a wide range of service categories such as car sharing, mobility, human resources and space sharing (Figure 3-5).

In recent years, the market has become more aware of the potential for sharing in new domains, such as skills and money, and we can therefore expect it grow along with changes in values and technological reforms (Figure 3-6).

¹ Sharing Economy Association, Japan and InfoCom Research, Inc. '2021 Results of a Survey Related to Sharing Economy (market scale and economic ripple effects)'

Figure 3-5: Total number of M&A deals with the keywords 'reuse', 'rental' and 'sharing' by purpose/service

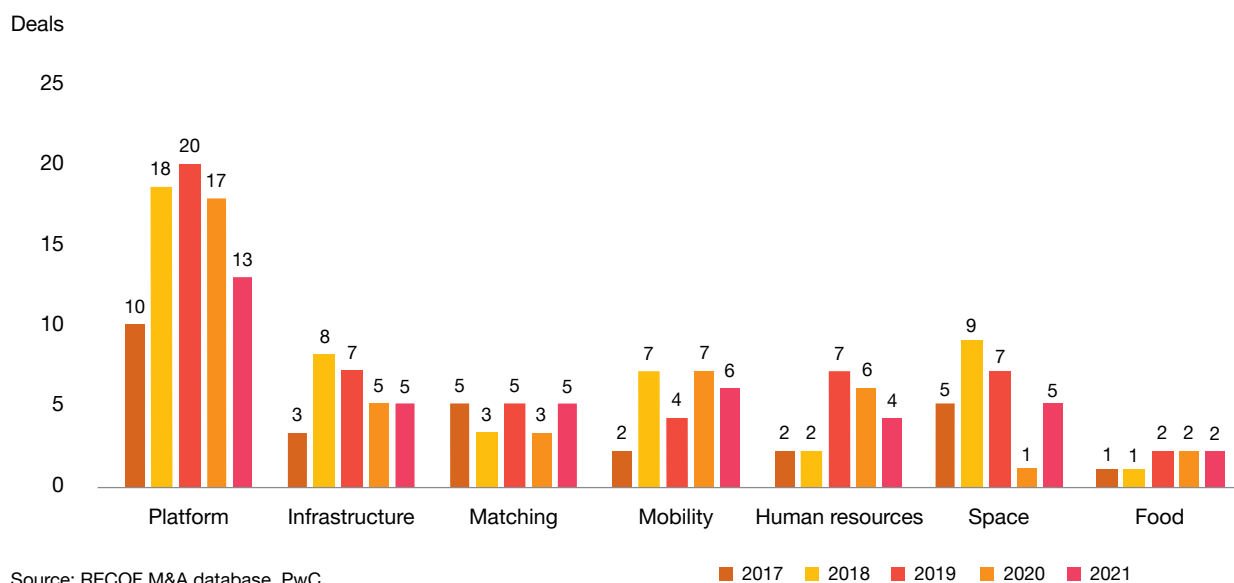


Figure 3-6: Survey on awareness and use of sharing economy-related services



Source: Survey on Awareness on the Sharing Economy in Japan 2021. PwC Consulting LLC

Examples of circular economy deals

The following are a few examples of companies that have used M&A deals as a measure to further the circular economy.

● Capital participation by Chubu Electric Power and Kubota in Ichikawa Kankyo Holdings

- Chubu Electric Power Co., Inc. (hereinafter 'Chubu Electric Power'), a comprehensive energy service provider, and Kubota Corporation (hereinafter 'Kubota'), a comprehensive manufacturer of industrial machinery and related products, each acquired in December 2021 the equivalent of 27.8% of shares of Ichikawa Kankyo Holdings Co., Ltd. (hereinafter 'Ichikawa Kankyo Holdings'), which operates resource circulation businesses such as biogas power generation and plastic recycling, resulting in a vertical M&A.
- In its 'Management Vision 2.0', the Chubu Electric Power Group has set forth the goal of realising a circular economy for the future society with respect to regional issues such as decarbonisation, revitalisation of primary industries and reduction of public debt. In its long-term vision 'GMB2030', the Kubota Group states its goal of 'realising solutions to promote the circulation of water resources and waste'. Both organisations have identified contribution to the SDGs as an important element of their management agendas.
- Chubu Electric Power and Kubota plan to actively work on the initiatives to realise a circular society by combining the significant management resources of the two companies with the Ichikawa Kankyo Group's abundant experience and knowledge related to resource circulation businesses.
- The initiatives of the two companies are in line with the measures to build social and economic systems aimed at energy and resource circulation mentioned in the Revised Act on the Promotion of Global Warming Countermeasures. Chubu Electric Power also established a regional infrastructure business office in April 2022 to accelerate its initiatives.

● Merger of Takeei and Rever Holdings

- Takeei Corporation, which has strengths in the area of construction-related industrial waste disposal, and Rever Holdings Corporation, which has strengths in metal recycling, established a joint holding company in October 2021 to carry out a business merger.
- Through the merger, the two companies plan to provide 'an integrated service from the design and construction to operation of businesses in

various areas, including recycling, intermediate treatment, waste and biomass power generation and final disposal', throughout the 'venous' (waste management) value chain. This will enable them to contribute to the creation of 'an advanced recycling-oriented and decarbonized society', in response to the Japanese government's pledge to aim for net zero GHG emissions by 2050. The two companies are aiming to build an environmental business model that will make it possible for them to lead the waste recycling and treatment industry—a business model they can proudly display to the world.

Implications for future developments

Amidst the anticipated emergence of geopolitical risks and dramatic changes in the business environment, such as soaring prices of energy and resources and competition to obtain them, we expect that efforts related the circular economy will become even more important in the future.

The environmental policies of the Japanese government also support this trend. In January 2022, the Ministry of the Environment launched a public call for applications for 'Decarbonization Leading Areas'—initiatives aimed at achieving net zero CO2 emissions from electricity consumption by the residential and commercial sectors by FY2030. The Ministry of the Environment aims to certify 100 such areas over the next five years and plans to provide support of 20 billion yen in FY2022. The government has also expanded financial support, including the Green Innovation Fund (2 trillion yen in total over 10 years) established in 2021 and a new public-private fund to be established to support decarbonisation projects.

These developments have the potential to drive innovation in technologies and business models aimed at decarbonisation in the future. At the same time, they should accelerate M&A deals related to the circular economy aimed at industrial transformation, the construction of regional ecosystems, and seamless collaboration between 'arterial' (manufacturing) and 'venous' (waste management) industries.

Renewed momentum for plastic recycling

Along with decarbonisation issues, international awareness of the issues of resource circulation of waste plastics is on the rise. The 2030 Agenda for Sustainable Development, established in 2016, also addresses such issues as the low rates of effective use of waste plastics and environmental pollution caused by marine plastic waste. In May 2019, plastics were added to the scope of the regulations set forth the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, which now controls the export of waste plastics to China and other Asian countries. This revision, which sharply increased the amount of waste plastic treated in Japan and led to a surge in treatment costs, is still a recent development.

In light of these global trends, the momentum for the use of recycled plastics has been increasing in Japan, and in May 2019, the Ministry of the Environment and the Ministry of Economy, Trade and Industry took the lead in formulating the Resource Circulation Strategy for Plastics. This strategy sets targets such as reusing and recycling 60% of one-way plastics by 2030 and doubling the amount of recycled plastics.

In April 2022, the Act on Promotion of Resource Circulation for Plastics, which introduces the obligation to recycle waste plastics, came into effect. Manufacturers therefore have a strong interest

in the use of recycled plastics, and in particular, companies that use a large amount of plastic containers and plastic packaging materials, such as food and beverage companies and consumer goods manufacturers, have set ambitious targets, including achieving 100% recycled polyethylene terephthalate (PET) by 2030.

In response to the strong demand for recycled plastics, a shortage of high-quality waste plastic raw materials has arisen, and the manufacturing capacity of recycled plastics is insufficient. Under these circumstances, some companies are proactively embarking on 'closed recycling' businesses, which involves conducting the entire process from waste plastics collection to recycled materials production in-house. Still, some remain to be addressed for promotion of the plastic recycling businesses, as shown in Figure 3-7.

To this end, an increasing number of chemical companies and other manufacturing companies both inside and outside Japan are entering into partnerships with the aim of (1) acquiring and expanding their collection networks with recycling companies to secure recycled raw materials, and (2) incorporating the technologies and business foundations of companies that possess chemical recycling technologies.

Figure 3-7: Issues related to plastic recycling

Need		Anticipated issues
M&A potential	1 Responding to changing needs and regulations	<ul style="list-style-type: none"> ✓ The need for the use of recycled plastics is rapidly increasing both inside and outside Japan due to factors such as the 2030 Agenda for Sustainable Development and the enforcement of the Plastic Resource Circulation Act. Companies will need to set specific targets and strategies, such as stepping up the production of recycled plastics, in anticipation of future market trends.
	2 Securing waste plastic collection routes	<ul style="list-style-type: none"> ✓ Although companies are making increased efforts to use recycled plastics, the movement toward closed recycling is accelerating, and a shortage of high-quality recycled plastics can be anticipated as a result. ✓ We anticipate shortages or price hikes of the waste plastics needed as raw materials for the production of recycled plastics. Companies will need to secure stable waste plastic collection routes.
	3 Developing and acquiring recycling technologies	<ul style="list-style-type: none"> ✓ Technologies to develop recycled materials that meet the quality- and price-related needs of manufacturers are essential. ✓ Companies will need to respond more quickly, especially regarding chemical recycling technologies, which require more time for development.

M&A deals related to plastic recycling: The example of Mitsubishi Chemical

The recent acquisitions made by Mitsubishi Chemical Corporation (hereinafter 'Mitsubishi Chemical') are one good example of these trends.

In their new management policy, 'Forging the Future', which was announced in December 2021 and covers the period up to the end of FY2025, Mitsubishi Chemical states their aim to build a business portfolio that emphasises market growth, competitiveness and sustainability, along with the policy of restructuring their petrochemical and carbon businesses. As a prelude to this, the medium-term management plan 'APTSIS 25 Step 1' which was formulated in February 2021 and covers the period from FY2021 to 2022, calls for initiatives aimed at creating a 'plastics recycling society' through supply chain management involving customers and consumers. Based on these policies, Mitsubishi Chemical is developing various businesses related to plastic recycling in Japan and overseas through M&A deals and other types of cooperation with other companies.

- In July 2021, Mitsubishi Chemical and ENEOS Corporation (hereinafter 'ENEOS') announced the construction of a chemical recycling facility at Mitsubishi Chemical's Ibaraki Plant (located in Kamisu, Ibaraki Prefecture). The facility will have the largest capacity in Japan to process waste plastics into oil. The companies will use a technology licensed from Mura Technology in the UK for the project. Kashima Oil Co., Ltd. and Mitsubishi Chemical Ibaraki Plant aim to strengthen their competitiveness by jointly optimising their operations and to realise the chemical recycling of waste plastics by using oil refinery facilities and petrochemical facilities such as naphtha crackers. The facility is scheduled to start operations in FY2023.
- In August 2020, with the aim of building an integrated system to handle processes from waste

treatment to resin production, Mitsubishi Chemical made a capital participation in Refinverse, Inc. (hereinafter 'Refinverse'), which primarily operates a construction-related industrial waste collection and transportation business. In July 2021, in conjunction with the joint construction of waste plastic recycling facilities with ENEOS, Mitsubishi Chemical signed a basic agreement with Refinverse on the procurement of waste plastics as a raw material. Refinverse is examining the possibility of collecting various types of raw material plastics, such as polypropylene and polyethylene, as well as polystyrene and PET resin, from a wide range of objects included in industrial waste, construction waste etc.

- Mitsubishi Chemical is also actively working on plastic recycling-related M&A deals in Europe. In February 2020, through their Swiss subsidiary, they took over the business of the Switzerland-based Minger Group, an engineering plastics recycling company group. In August 2020, they acquired two Germany-based carbon fibre recycling companies, CFK Valley Stade Recycling GmbH & Co. KG and carboNXT GmbH. These companies have recycling technologies for engineering plastics and carbon fibres, as well as recovery networks with companies that discharge waste plastics. Through these business transfers, Mitsubishi Chemical is to establish a thorough value chain for engineering plastics and carbon fibres in Europe—from manufacturing to recovery and recycling.

These are some examples of Mitsubishi Chemical's M&A deals related to plastic recycling in Japan and overseas. Other chemical and manufacturing companies also have begun to take action through M&A deals aimed at acquiring or expanding collection networks and obtaining chemical recycling technologies. We expect this trend of industry reorganisation for achieving a circular economy to continue to pick up speed going forward.



4. Important perspectives in future M&A

In the previous sections, we addressed the themes of decarbonisation and the circular economy, which are particularly important ESG issues, in relationship with M&A deals in the Japanese market. Companies are already showing heightened interest in these areas, which is notably reflected in the number and types of related M&A deals.

In this section, we discuss the themes of biodiversity and human rights in relation to the M&A market in Japan. We also expect these to become increasingly important ESG issues for companies, requiring them to take measures accordingly.

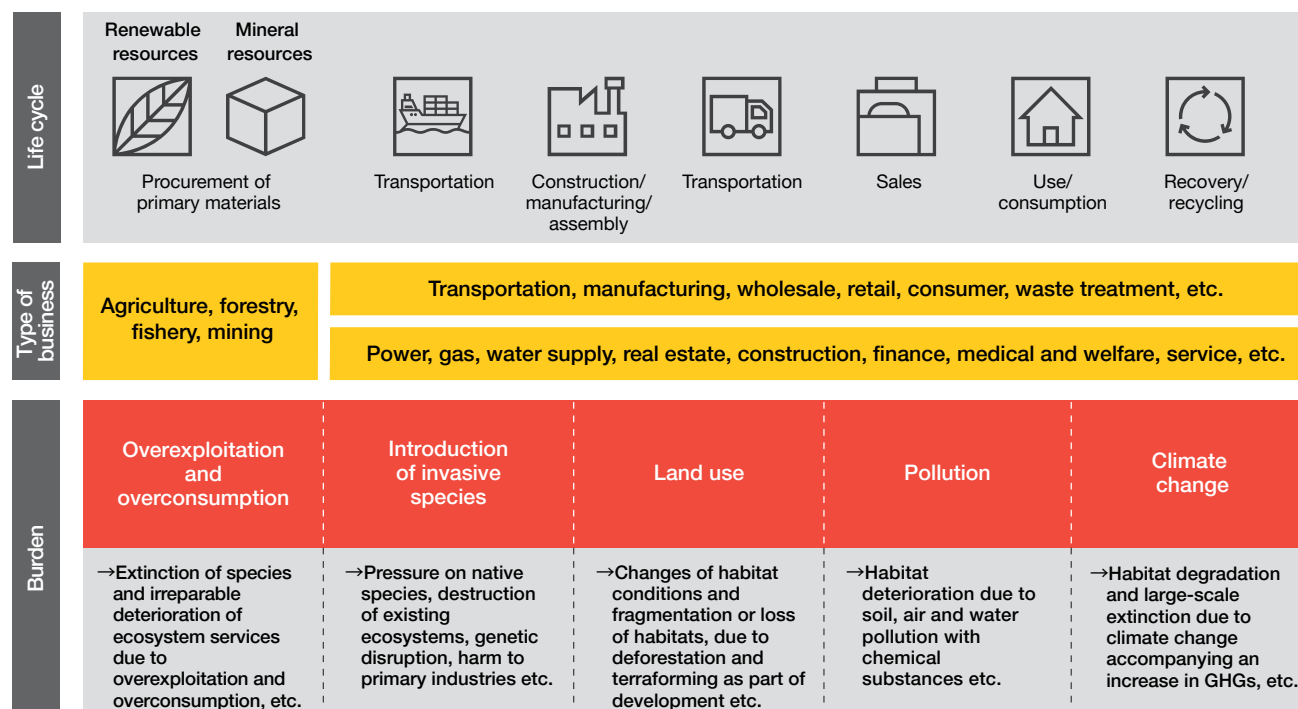
Biodiversity

The Ministry of the Environment of Japan defines 'biodiversity' as 'the variety of individualities and connections among living organisms'.² At present, 30 million species of diverse organisms are said to live on the earth, all of which directly or indirectly support each other. Human economic activities also depend on this biodiversity. The World Economic Forum states that more than half of the world's total GDP depends on the natural environment to moderate or high degrees.³ In recent history, various human factors have greatly impacted

ecological systems around the world. In the Global Risk Report issued by the World Economic Forum in 2020, biodiversity loss is listed among the top five risks in terms of impact and likelihood.⁴ In particular, corporate business activities have the potential to impose a burden on biodiversity throughout the entire supply chain (Figure 4-1). Therefore, corporate management in the future will need to understand this impact and to plan and implement measures to reduce the related burden.

Amidst these circumstances, the Taskforce on Nature-related Financial Disclosures (TNFD) was officially launched in June 2021 as a new initiative to follow the TCFD. The TNFD plans to publish a framework to promote the disclosure of the financial impacts of companies and financial institutions in relation to global biodiversity and natural ecosystems, along with their response to these impacts. We anticipate that the specification of information related to biodiversity and natural ecosystems as items to be disclosed in disclosure systems related to corporate management will cause them to become important sustainability management issues, alongside climate change, that companies and other organisations will need to address.

Figure 4-1: Burden of business activities on biodiversity



Source: Developed by PwC based on the Ministry of the Environment (2017). 'Guidelines for Private Sector Engagement in Biodiversity' (2nd Edition)

² The Ministry of the Environment website: <https://www.biodic.go.jp/biodiversity/about/about.html>

³ World Economic Forum (2020). 'Nature Risk Rising: Why the Crisis Engulfing Nature Matters for Business and the Economy'

⁴ World Economic Forum (2020). 'The Global Risks Report 2020'

In corporate M&A deals, as well, an increasing number of companies are now investing in technologies and businesses that directly or indirectly support the preservation and improvement of biodiversity for the purpose of incorporating such preservation into their own businesses. The following are two relevant examples.

Example 1: Cultured meat

Livestock farming is one of the human economic activities that has a particularly significant impact on the natural environment. The cultivation of livestock feed crops, such as soybeans and corn, requires vast amounts of farmland, and forests containing diverse ecosystems are cleared for this cultivation. Emission of methane, a GHG, from the digestive organs of cattle is another issue. One solution that has been gaining attention in response to these problems is cultured meat, meat produced by culturing cells. The technology used to produce cultured meat is also expected to reduce the burden on the soil and control GHG emissions.

In Japan, a start-up called IntegriCulture Inc. is using low-cost cell culture technology as a new platform in the field of biotechnology, with the goal of manufacturing foods composed of cultured animal cells. NH Foods Ltd., a major food company, has already invested in the company, which also raised 780 million yen in funds from a total of 12 companies including multiple venture capital firms in January 2022.

Case 2: Soil management

The world population will reach 9.7 billion by 2050, according to the United Nations World Population Prospects. Based on this, Japan's Ministry of Agriculture, Forestry and Fisheries predicts that the demand for food will increase 1.7 times.⁵ This raises concerns about adverse influences on ecosystems caused by the expansion of agricultural areas, as well as excessive land modification, which is used not only to expand agricultural land areas but also to increase yields per area.

One recent example of a company responding to this trend is the case of Kubota Corporation, a leading agricultural machinery and equipment company, which announced an investment in Bloomfield Robotics, Inc., a Pittsburgh-based agricultural start-up, in December 2021. Bloomfield Robotics is a start-up from Carnegie Mellon University, which develops harvest management systems for farms and orchards that make use of AI and cameras. The company aims to both achieve appropriate management of farmland and increase yields by using AI-based systems.

As seen in these cases, most of the current M&A deals in this area involving Japanese companies are centred on investment in start-ups by food and agricultural companies. When the TNFD increases the pressure on companies to disclose information related to biodiversity, we expect the number of investments in technologies and services necessary for biodiversity preservation to grow in a wide range of industries.

Human rights

Human rights issues, unlike environmental issues, are unlikely to serve as a driver for M&A deals on their own. However, given the growing demand for companies to respect human rights, we should recognise that the

perspective of human rights is already a factor that cannot be ignored even in M&A.

In response to the Guiding Principles on Business and Human Rights that were endorsed by the United Nations in 2011, which stipulate 'corporate responsibility to respect human rights' as one of their three pillars, various countries have been working to formulate national action plans, as well as legislation regarding the disclosure and human rights due diligence—for example, by enacting laws against modern slavery. In Japan, the National Action Plan on Business and Human Rights was formulated in October 2020, and guidelines on human rights due diligence is scheduled to be published in the summer of 2022. The demand for companies to address human rights issues is further increasing.

In 2021, US customs officials seized a shipment of clothing from a Japanese apparel company, under suspicions that the company had a relationship with forced labour in Xinjiang Uyghur Autonomous Region. In relation to M&A deals, Kirin Holdings announced its decision to dissolve its joint venture with a company affiliated with the Armed Forces of Myanmar that staged the coup d'état. Kirin Holdings is also planning to withdraw from business in Myanmar. When an affiliate of Kirin Holding was working on an M&A in the US, a human rights group encouraged the employee shareholders of the target company to oppose the M&A.

When it comes to human rights issues, it is no longer enough for companies simply to comply with the laws and regulations of the country where the target company operates. Human rights issues involve not only the target company, but also the entire supply chain, and cover a wide range of internationally recognised issues, including forced labour, child labour, gender discrimination and harassment and violations of occupational safety standards. Serious human rights issues can severely damage the reputation, business performance and corporate value of the target company, and can be a deal breaker in M&A deals.

To prevent this, sellers in M&A deals should ensure that the target company has a solid policy on respect for human rights in advance of the deal. The target company should also prepare human rights due diligence on the value chain. (In this case, 'human rights due diligence' refers to a series of continuous processes to identify human rights risks, evaluate them and take further corrective measures, as opposed to the short-term or one-off due diligence carried out in M&A deals). The target company should also have a grievance mechanism for responding to human rights violations. If measures are taken in line with the above guiding principles, not only will the companies reduce human rights risks, but they will also be highly evaluated compared to companies that do not do so.

From a buyer's perspective, companies should investigate human rights risks during the due diligence phase by investigating the target company on whether they have the systems mentioned above, whether their human rights measures are effective, and whether there are any serious human rights issues in the company.

As described in this report, consideration for human rights is becoming indispensable in the world of M&A deals, and the importance of due diligence to identify human rights risks is further increasing.

⁵ United Nations. 'World Population Prospects 2019'. Ministry of Agriculture, Forestry and Fisheries. 'World Food Supply and Demand Projections for 2050'

About RECOFDATA Corporation

<https://www.marr.jp/>



RECOFDATA Corporation has been building up an M&A database for information since 1985. Based on the idea that this database should be a common asset for the development of M&A in Japan, RECOFDATA edits and publishes the M&A trade journal MARR, operates the M&A information and data site MARR Online and provides the search service RECOF M&A Database.

To support human resources development in M&A and the vitalisation of the industry, RECOFDATA also operates the M&A Forum, including the M&A Forum Academy and the M&A Forum Award, which recognises outstanding works and research papers related to M&A. Their subsidiary MARR Matching provides a venue for matching through their M&A matching platform.

By providing a reliable M&A database, RECOFDATA helps companies execute their M&A strategy to grow and helps drive the development of the M&A market, ultimately contributing to the development of Japanese industry.

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